

## ABSTRACT

A device for creating microgradients in solution is disclosed. The device contains a microfluidic channel with openings at each end and two or more small apertures to a bath. Electrodes are placed in the openings at either end of the channel and an electrical power supply is connected to the electrodes. Several distinct current paths exist from one end of the channel to the other. For example current may flow from one electrode, through a portion of the channel, through an aperture into the bath, back through another aperture into the channel, and along another portion of the channel to the other electrode. Current flows along all possible connected paths when an electric field is applied along the channel and induces fluid flow into and out of the apertures in the channel. Fluid flow through the apertures results in the formation of microgradients in solution near the microfluidic channel device.